Convergence of Series

Key Learning: It is easier to show convergence than to figure out the limit (sum)

Comparison Test

Assume there are two series, $\sum a_k$ and $\sum b_k$. AND $a_k > b_k$ for every k (after a certain #)

$a_k > 0$
b_k

$$a_k > b_k$$

If $\sum b_k$ diverges... then so does $\sum a_k$

If $\sum a_k$ converges... then so does $\sum b_k$

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Limit Comparison Test

like integral test.

Two positive-valued series, $\sum a_k, \sum b_k$

let $L = \lim_{k \to \infty} \frac{a_k}{b_k}$

$\sum a_k = W$

$\sum b_k \approx \frac{W}{L}$

$\sum a_k$ diverges for $\sum b_k$ to converge

the b_k have to be "significantly smaller" than the a_k

$L > 0$ means

$\sum a_k$ & $\sum b_k$ both converge

OR both diverge.

Ratio Test

problem w/ comparison tests: * need to know about a series
* that's "related" somehow to the one in question

Advantage: * totally internal

Let $L = \lim_{k \to \infty} \frac{a_{k+1}}{a_k}$ ($(k+1)$th term / k^{th} term)

If $L > 1$ .... diverges

$L < 1$ .... converges

$L = 1$ .... IDKA

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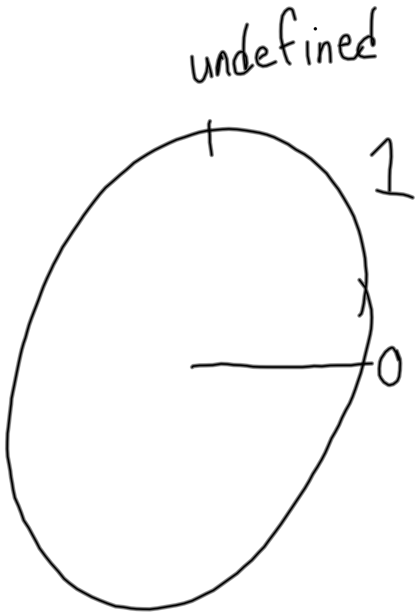
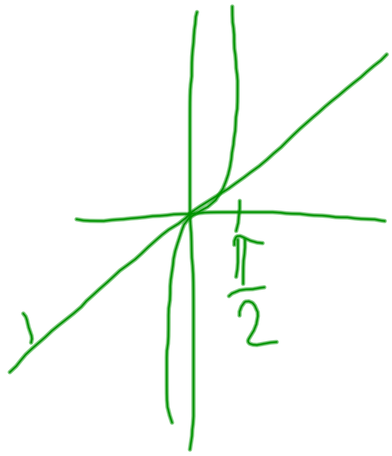
HW 10.6/1-24

I love cheese!
(and calc)..
Look up the song souljaquest

$$\frac{\sin x}{\cos x}$$

$\tan x$





$$\lim_{x \to \infty} \tan^{-1} x$$

$\tan^{-1} x$ is the angle whose tangent is x